



GPS

Quectel Cellular Engine

SiRF4 AGPS Application Notes

SiRF4_AGPS_AN_V1.0



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0. Revision history

Revision	Date	Author	Description of change
1.0	2011-08-05	Crystal HE/Ree ZHANG	Initial

1. What's CGEE?

GPS aided information that improves Time To First Fix (TTFF) and accuracy for a wide array of mobile devices with varying connectivity and performance characteristics is of critical importance to Location Based Services (LBS). SiRF technology provides a CGEE function to shorten the TTFF time especially in warm start mode by storing the ephemeris data in an external EEPROM.

The document describes how to use the AGPS also known as CGEE (Client Generated Extended Ephemeris) supported by SiRF starIV chipset. Shorter time for cold/warm start, particularly warm start only around 10 seconds, and faster positioning can be achieved by use of the CGEE. The stored ephemeris can be available within the next 3 days.

This document is written for SiRF4 ROM1.3 firmware.

1.1. Related Documents

Table 1: Related documents

SN	Document name	Remark
[1]	L20_AGPS_AN_V1.0	L20 AGPS Application Note

1.2. Abbreviations

Table 2: Abbreviations

Abbreviation	Description
CGEE	Client Generated Extended Ephemeris
GPS	Global Positioning System
GGA	GPS Fix Data
GLL	Geographic Position Latitude / Longitude
GSA	GNSS DOP and Active Satellites
GSV	GNSS Satellites in View
NMEA	National Marine Electronics Association
OSP	One Socket Protocol
TTFF	Time-To-First-Fix
UART	Universal Asynchronous Receiver & Transmitter
VDOP	Vertical Dilution of Precision

2. How to Use CGEE?

2.1. Reference Design

The functional schematic diagram of CGEE is shown in Figure 1.

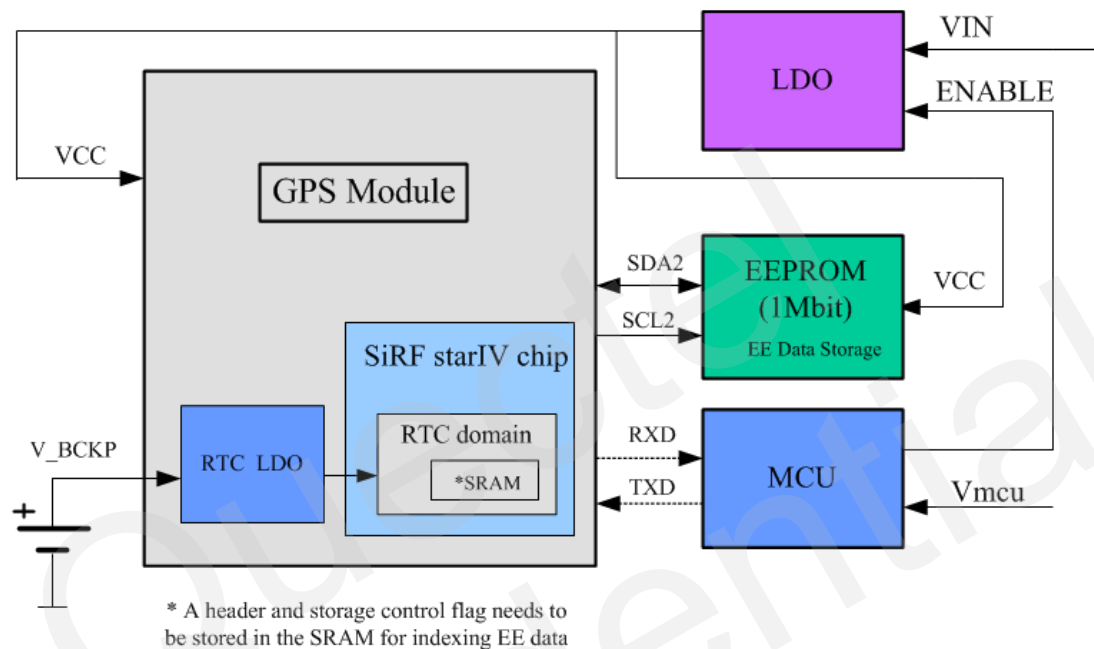


Figure 1: Functional schematic diagram of CGEE

The external 1Mbit EEPROM is used to store Client-Generated Extended Ephemeris (CGEE) data generated by SiRF starIV chip through I2C ⁽¹⁾ port. Some information including control flag and header of EE Data are written in the SRAM which belongs to the RTC domain in the chip. When the module is restarted, this information will extract EE data from the EEPROM. V_BCKP is used to supply power to the RTC domain, when VCC is removed; the information saved in the SRAM will be lost, and the CGEE data files stored in the serial EEPROM will not be accessed accordingly when the GPS module starts up next time. If the GPS module is powered on again, the system will generate new CGEE data files which will be stored in the eternal EEPROM, and the corresponding new header and control flag will be written in the SRAM.

Thus, it is strongly recommended to use two separate voltage sources, VCC and V_BCKP, in design. V_BCKP should be kept alive as long as possible.

(1) The I2C port is open-drain output and supports up to 400kbps for accessing the EEPROM. The data line and clock line are internally pulled up to VCC by 2.2K resistors.

2.2. Recommended EEPROM

Some types of 1Mbit EEPROM have been tested to be available. The type and manufacturer are listed in table 3.

The reference circuit of EEPROM is shown in Figure 2.

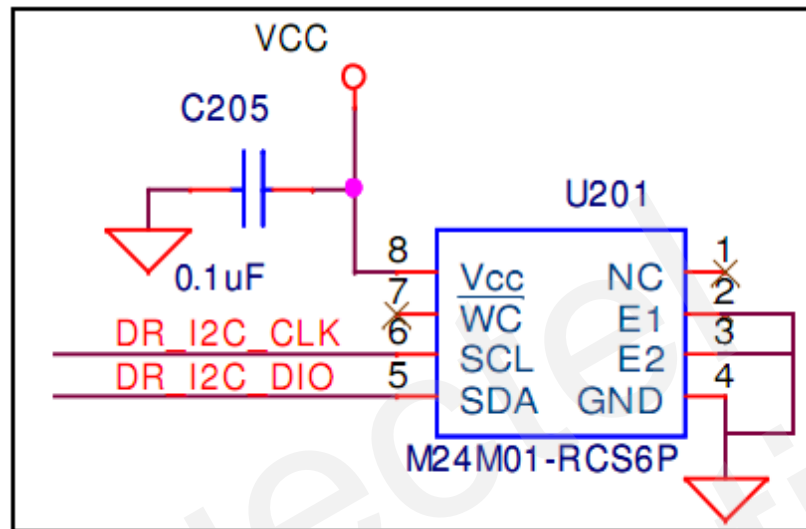


Figure 2: EEPROM reference circuit

Table 3: Recommended EEPROM

Manufacturer	Part Number
ST	M24M01
Seiko Instruments Inc.	S-24CM01C
Atmel	AT24C1024B

3. How to Implement CGEE?

For SiRF ROM 1.3 version, the default configuration is accessing EEPROM and CGEE will be in effect when the GPS module starts up, so the customer needn't do some procedures as SiRF ROM 1.0 version did.

If the customer wants to know how to implement CGEE using SiRF ROM1.0 version GPS module, you can refer to the documentation of L20_AGPS_AN_V1.0.

4. Test data of CGEE

The following table shows the test data of CGEE function.

Table 4: Test data of CGEE

Warm Start	No CGEE (s)	With CGEE (s)
1	34	10
2	31	11
3	33	12
4	35	11
5	32	13
Cold Start	No CGEE (s)	With CGEE (s)
1	35	25
2	33	24
3	34	24
4	33	26
5	32	25

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